

which the leaves are lanceolate, acute at the apex, and rounded at the base, very much as in *R. incurva* Moore. A photograph of a fruit-bearing branch (No. 1571) was secured. The fruit, about 4.5 cm. in diameter, is composed of comparatively few large, pointed carpels. It is yellow when mature and edible, but rather insipid. As no flowers were secured, it is not possible to place this plant in one of the groups here proposed.

ZOOLOGY.—*Ophiomaria*, a new genus of ophiurans from southern South America and the adjacent portion of the Antarctic continent.¹ AUSTIN H. CLARK, National Museum.

Two new species of ophiurans from the coast of Chile which were dredged by the *Albatross* on her journey from the Atlantic to the North Pacific represent a type which appears to be intermediate between *Ophioperla* and such species of *Ophiosteira* as *O. senoqui* Koehler and *O. koehleri* A. H. Clark, possessing the general structure of the latter combined with the granular disk covering of the former. Together with two other species, described in 1901 by Professor Rene Koehler these forms appear to represent a logical generic unit which may be known as

Ophiomaria, gen. nov.

Genotype.—*Ophiomaria tenella*, sp. nov.

Diagnosis.—The disk is pentagonal or more or less stellate. The dorsal surface is beset with fine granules which to a greater or lesser degree conceal the plates. In the central portion of the interbrachial spaces below there are usually numerous granules which surround, or even entirely conceal, the plates.

The arms are slender and evenly tapering, in length equal to about four times the diameter of the disk, circular in section proximally, becoming slightly flattened distally, rarely carinate.

The arm comb is represented by a narrow band of irregular plates or beadlike granules beyond the radial shields which recall the supplementary arm plates in *Ophiopholis*.

At the base of the arm the upper arm plates are usually very wide, narrowly oblong; they rapidly become narrowly fan-shaped, and in the distal half of the arm very small and widely separated from each other.

There are from three to five minute spaced arm spines.

¹ Published with the permission of the Secretary of the Smithsonian Institution.

The other characters are essentially as in *Ophiura* (Ophioglypha).

Range.—From the Antarctic regions in the vicinity of Cape Horn northward along the coast of Chile to 38° 8' N. lat., in from 260 to 677 fathoms.

Remarks.—In addition to the two species described below, this genus includes *Ophiomaria carinifera* (Kœhler) and *Ophiomaria doederleini* (Kœhler).

***Ophiomaria tenella*, sp. nov.**

The disk is thin and stellate, the angles continuing uninterruptedly into the arms, which taper very gradually and become very slender distally. The disk is 11 mm. in diameter, and the arms are 40 mm. long.

The central portion of the dorsal surface of the disk is covered with a close and regular fine granulation through which, in some specimens, the six small rounded primary plates are visible. Toward the periphery of the disk this granulation becomes coarser and more irregular, the granules transforming into small flat polygonal plates. In the center of the strongly excavated interbrachial margin of the disk, as viewed dorsally, there is a transversely oval or semicircular plate, usually about twice as broad as long; between this and the radial shields on either side there is usually a plate about half as large, more or less circular or irregularly polygonal in outline, and a few, very irregular, much smaller plates. Within this interbrachial border, as within the most proximal plates in the columns separating the radial shields, there may be a few irregular polygonal plates bordering the granular covering of the central portion of the disk.

The radial shields are irregular rounded triangles, nearly or quite twice as long as wide, about as long as the width of the arm immediately beyond the disk. The radial shields of each pair are separated interiorly by a series of two or three plates of which the innermost is considerably longer than the others; between this last and the granulation of the center of the disk there are usually a few irregularly polygonal plates of various sizes. From the distal end of the outermost plate in the series between the radial shields there runs around the distal borders of the latter a series of two or three or more irregular plates (more rarely a double series) which takes the place of an arm comb. The upper surface of these plates is even both with that of the radial shields and with that of the arm plates beyond them.

The interbrachial spaces below are filled with irregular polygonal scales which are largest along the lateral borders, becoming smaller and more or less surrounded by or covered with granules centrally; toward the oral shields they tend to imbricate more or less.

The genital slits are long, reaching from a notch in the middle of the sides of the oral shields to the border of the disk as viewed ventrally; they are bordered with small truncate closely crowded papillae.

The proximal edges of the oral shields are straight and make nearly

a right angle with each other; the sides are roundedly incised by the proximal ends of the genital slits; the outer corners are broadly rounded; and the distal border is concave or sometimes convex. The length of the oral shields is equal to, or slightly exceeds, the breadth.

The mouth papillae are five in number; the innermost is triangular and sharp pointed, the others lower, truncated distally. Continuing these is a series of five, more rarely six, papillae bordering the first arm tentacle abradially, of which the outermost is broad and triangular, with the apex over the proximal end, the others small, subequal, rounded distally; opposite these on the first under arm plate are two, rarely three, large tentacle scales, of which the outermost is about as large as the outermost in the other series, and twice as large as the inner.

The side mouth shields are narrow, about four times as long as broad, with parallel sides, and incised near their outer ends by the furrows lodging the first arm tentacles.

The first upper arm plate distal to the row of plates bordering the radial shields is very narrow, almost handlike, nearly spanning the arm in dorsal view; the next is longer and wider, with converging sides and a convex distal border; the following ones decrease regularly in width, increasing in relative length, at the fifteenth or sixteenth becoming triangular, twice as long as broad, with the distal border strongly convex; beyond the sixteenth each upper arm plate is separated from the preceding by an increasingly greater relative distance, as a result of the increasingly broader union of the side arm plates.

The arm spines are very short and slender, on the first ten side arm plates three or four, commonly in two well spaced pairs, beyond these five, toward the end of the arm four, usually in two spaced pairs, and at the tip of the arm three. At first the arm spines are equal in length and size; beyond the basal third of the arm the lowest increases in relative length, soon becoming twice as long as the others.

The first under arm plate is fan-shaped, the outer border strongly convex, the very short inner border strongly concave. The second is usually slightly longer, twice as broad proximally, the lateral borders slightly concave, the distal border with a median convexity and two slight lateral concavities; the tentacles on either side are protected by four scales inwardly and three outwardly. The third is similar, but with a much narrower base and more converging sides. The fourth is rhombic. The fifth is rhombic, shorter, in contact with the fourth. The next two are shorter, rhombic, but with the outer angles cut away by the tentacle grooves, widely separated from each other. The following ones have a low convex distal border and the outer part of the proximal border cut away by the tentacle grooves. Beyond the middle of the arms the under arm plates lie entirely between the tentacle grooves; they become very minute in the distal portion of the arm.

Type.—Cat. No. 38580, U. S. N. M., from *Albatross Station* 2785, off the coast of Chile, in 449 fathoms.

***Ophiomaria rugosa*, sp. nov.**

In the largest specimen the disk is 16 mm. in diameter, and the arms are about 50 mm. long.

The disk is pentagonal with slightly concave sides, less stellate than that of *O. tenella*, thick, at the angles of the pentagon curving abruptly downward to the arm bases. It is covered dorsally with fine granules which become coarser toward the margin, where they tend to transform into an irregular mosaic of small, very irregular, polygonal plates, especially at the arm bases; the radial shields are covered.

The granulation of the disk may cover uniformly all of the plates, but usually one or more of the following series are visible; six widely separated circular or oval primary plates, much swollen and elevated above the general surface; a similar plate at each arm base, with sometimes a small one beyond it; between the plates at the arm bases a similar but smaller plate, about the size of the central plate, in the mid-interradial line; a small plate on either side of a line between each peripheral primary plate and the plate at the base of the corresponding arm; a plate in the middle of each interbrachial border, as viewed dorsally, which sometimes forms the center of a series of very irregular plates between the arm bases.

The arms are essentially as in *O. tenella*, but the side arm plates and upper arm plates are rather strongly convex in profile, so that the arms appear rugged.

The plates in the interbrachial areas below are much smaller than the corresponding plates in *O. tenella*, and the granules are more abundant, smaller, and more generally distributed.

On the ventral surface there appear to be no essential differences between this species and *O. tenella*.

Very young individuals with the radial shields exposed differ from young specimens of *O. tenella* in having smaller and more numerous central plates on the dorsal surface of the disk, and swollen arm plates.

Type.—Cat. No. 38579, U. S. N. M., from *Albatross Station* 2791, off the coast of Chile, in 677 fathoms.

PHYSIOLOGY.—*Food economics*.¹ GRAHAM LUSK, Professor of Physiology, Cornell University Medical College, New York.

The consideration of the food supply from a national standpoint was forced upon Germany at the outbreak of the great war which is now in progress. Eminent scientists combined in a report upon the prospects of the sustenance of the nation.

¹ A lecture delivered before the Washington Academy of Sciences, April 14, 1916.